

# Observations on Brucellosis in Iowa

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THE FIRST diagnosis of human brucellosis in Iowa was made in 1926 (1). Subsequent reports have emphasized the public health significance of the disease in this State (2-5). The reported incidence of human brucellosis in Iowa from 1936 to 1963 is shown in the graph. The low points in 1948 and 1949 reflect a temporary failure in the reporting system rather than a reduction in incidence.

During the 12-year period, 1952-63, 4,093 cases of human brucellosis were reported to the Iowa State Department of Health. The occupations of 2,573 of these patients are shown by major classifications in table 1. The most marked reduction of reported cases occurred among farmers. A slight decline was noted among packinghouse workers until 1960 when a sharp increase was caused primarily by an outbreak in a slaughterhouse (5). The trend among "other" occupations (livestock truckers, handlers or dealers, veterinarians, rural students, rendering plant employees, and rural housewives) was also downward, but not as markedly as among farmers.

Beginning in 1927, many recoveries of *Brucella* have been made at the State hygienic laboratory from blood, blood clots, and complicating lesions of human patients (table 2). Data for this entire period emphasize the importance of *Brucella suis* and *Brucella melitensis* (*Brucella suis* type 3) in Iowa. The numbers of organisms of each species recovered may or may not reflect the actual relative numbers of human

cases caused by the three species. The greater severity of human disease caused by *B. suis* and *B. suis* type 3 may have prompted more intensive study of these cases, with recovery of the organism, than the cases of *Brucella abortus* infection. While most *B. suis* infections in man result from contact with infected hogs, three milk-borne outbreaks of this type occurred in Iowa between 1941 and 1947 from consumption of raw milk from cows shedding *B. suis* (2, 3). Recent studies suggest airborne transmission of *B. suis* and *B. suis* type 3 (5).

Classification of the isolates recorded in table 2 was in accordance with the conventional methods for species differentiation of the genus *Brucella* described by Huddleson (6). The organisms originally classified as *B. melitensis* are most likely *B. suis* type 3, except for one which was isolated from a worker who became ill en route to Iowa from his home in Mexico (7, 8). Six of these *B. melitensis* strains recovered from human cases in the recent packinghouse outbreak (5) were studied by Dr. H. S. Cameron and Dr. Margaret F. Meyer, University of California, School of Veterinary Medicine at Davis. In personal communications in March and October 1961 they reported that all six strains were classified as *B. suis* type 3 by oxidative metabolic tests (9).

Two factors contributed largely to the high number of isolates in the mid-1940's. During a 1943-47 outbreak in a central Iowa packing plant, 80 *B. suis*, 9 *B. abortus*, and 8 *B. melitensis* isolates were recovered.

In addition, during the period July 1, 1944 to July 1, 1948, blood clots of all specimens positive on the agglutination test at the State hygienic laboratory were cultured routinely. This was discontinued later with the advent of antibiotics because many patients had received antibiotic therapy before the blood specimen was taken. Thus culturing of clots became

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**Table 1. Persons with brucellosis reported to the Iowa State Department of Health, 1952-63, by occupation**

Year	Farmers		Packers		Other		Total
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	
1952--	186	48	94	24	107	28	387
1953--	177	53	64	19	92	28	333
1954--	123	50	38	16	81	34	242
1955--	110	48	44	19	74	33	228
1956--	91	47	52	28	49	25	192
1957--	63	44	36	25	46	31	145
1958--	50	38	43	32	38	30	131
1959--	62	32	53	28	77	40	192
1960--	37	12	205	66	66	22	308
1961--	34	19	127	71	17	10	178
1962--	16	18	51	58	20	24	87
1963--	27	18	100	64	23	18	150

nonproductive. The increased number of isolations during 1960-63 reflects the packing-house outbreak in eastern Iowa (5).

Data relative to the reservoir of brucellosis in cattle and hogs in Iowa are shown in the graph. The bovine brucellosis eradication program by the State and Federal departments of agriculture was started in Iowa in the fall of 1934. In 1936, 16 percent of all animals tested reacted positively to the blood serum agglutination test for brucellosis. Since that time there has been a steady decline of reactors among cattle tested, except for an increase during World War II. The prevalence of the disease in cattle at present quite likely is lower than the graph indicates because the animals tested are selected. The milk ring test program in dairy herds was implemented gradually during the period 1951-56. It is used as a screening test, and herds that are reactive or suspicious on the ring test are blood tested. Thus blood testing in dairy herds is concentrated on those herds in which animals infected with *Brucella* are most likely to be found.

The rate of positive reactors among blood tested hogs has decreased in recent years. This may be due to the selection of animals for testing rather than an actual decrease in prevalence of the disease in swine (10). Even though blood tests suggest a comparatively low prevalence of the disease in swine, a significant human health hazard still exists. Swine raisers, their

families, and swine handlers are repeatedly exposed to infected animals. In a large packing-house, one infected hog passing through the slaughtering line may expose scores or even hundreds of employees. Even with only 1 percent of the hogs infected, as many as 50 or more infected hogs may be slaughtered during a single day in any one of the larger Iowa packing-houses. Thus it is likely that each employee on the killing floor would be intimately and repeatedly exposed to fresh, warm infectious tissues

**Table 2. *Brucella* isolations<sup>1</sup> from blood and blood clots and complicating lesions in human patients by the State hygienic laboratory, Iowa**

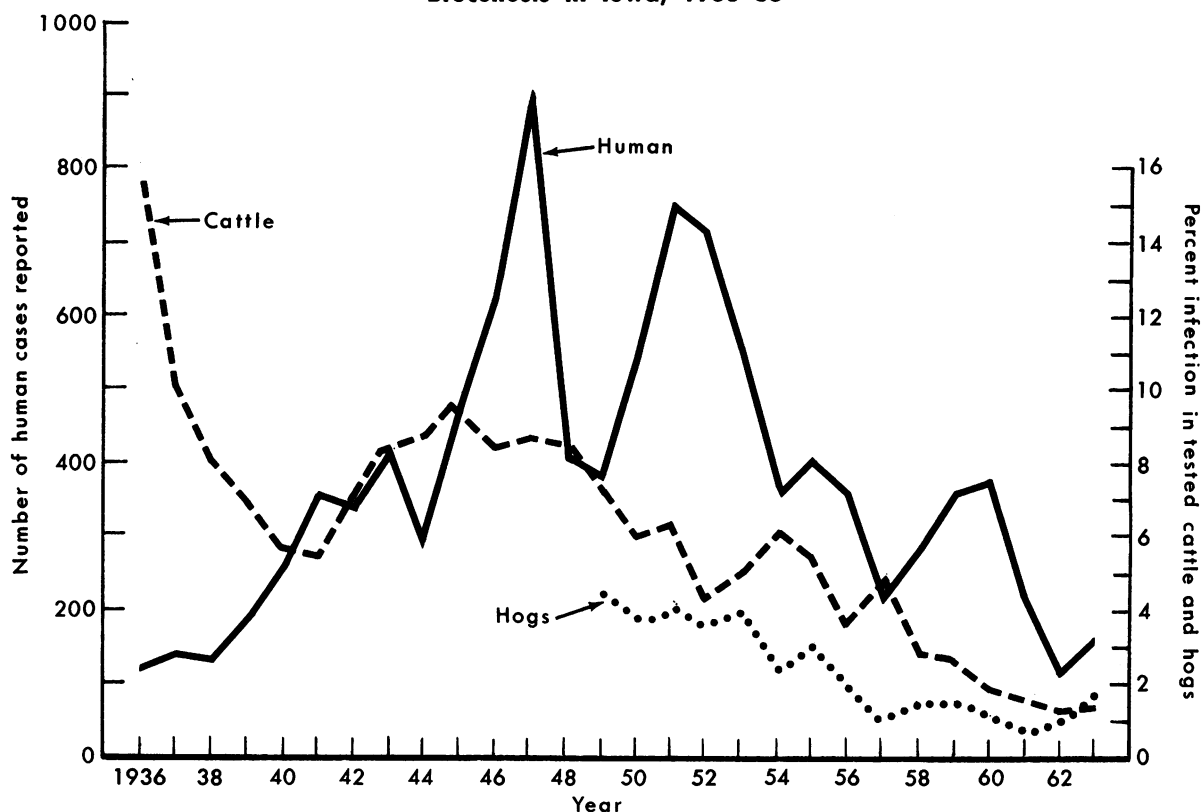
Year	<i>B. suis</i> (Percent = 56.3)	<i>B. abortus</i> (Percent = 23.9)	<i>B. melitensis</i> <sup>2</sup> (Percent = 19.3)	Unclassified (Percent = 0.5)	Total
1927-30-----	47	26	1	-----	74
1931-----	6	1	-----	-----	7
1932-----	6	5	-----	-----	11
1933-----	11	1	-----	-----	12
1934-----	8	4	-----	-----	12
1935-----	4	3	-----	-----	7
1936-----	13	3	-----	-----	16
1937-----	10	5	-----	-----	15
1938-----	7	3	-----	-----	10
1939-----	1	4	-----	-----	5
1940-----	3	2	-----	-----	5
1941-----	14	2	-----	-----	16
1942-----	2	2	-----	-----	4
1943-----	28	1	2	-----	31
1944-----	50	13	13	2	78
1945-----	24	15	17	1	57
1946-----	17	21	13	-----	51
1947-----	12	8	3	-----	23
1948-----	8	6	6	-----	20
1949-----	9	8	2	-----	19
1950-----	3	3	3	-----	9
1951-----	8	1	1	-----	10
1952-----	10	2	3	-----	15
1953-----	7	1	1	-----	9
1954-----	5	2	-----	-----	7
1955-----	2	1	3	-----	6
1956-----	2	-----	1	-----	3
1957-----	3	-----	1	-----	4
1958-----	-----	1	1	-----	2
1959-----	4	2	-----	-----	6
1960-----	8	-----	12	-----	20
1961-----	10	-----	6	-----	16
1962-----	3	1	8	-----	12
1963-----	1	-----	22	-----	23
Total-----	346	147	119	3	615

<sup>1</sup> Approximately 5 percent of the isolations were made by local laboratories and confirmed by the State hygienic laboratory.

<sup>2</sup> Most of these isolations were probably *B. suis* type 3, as explained in the text.

NOTE: Duplicates removed except where both blood culture and complicating lesion were positive.

# Brucellosis in Iowa, 1936-63



SOURCE: Data on cattle and hogs tested from Iowa Department of Agriculture and the U.S. Department of Agriculture.

each working day. Other employees may be subjected to indirect exposure by a contaminated environment.

## Summary

From 1952 through 1963 the greatest decrease in reported cases of human brucellosis in Iowa occurred among farmers. During the 37-year period, 1927-63, 615 *Brucella* isolates were recovered from infected persons. The reservoir of *Brucella* infection in cattle has been reduced markedly since 1936. Swine infected with *Brucella*, however, are still a significant health hazard to swine raisers and processors.

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